

AMENDMENTS TO THE CLAIMS

This Amendment cancels Claims 2-3; and amends Claim 1. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claim 1 is found in canceled Claims 2-3. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1 and 4-18 will be pending in this application. Claims 1 and 16 are independent. Claims 5-14 are withdrawn from consideration.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The technical idea of the present invention is mainly to design the surface of components of glass-like carbon to increase the adhesion strength between the components and films deposited during CVD. Thus, the component of glass-like carbon of the present invention has a surface finished such that there exist at least five pits, 1-10 μm in diameter, in the visual field, 50 x 50 μm , observed under a scanning electron microscope with a magnification of x1000, and/or a surface finished such that there exist elongated tiny depressions 0.5-5 μm wide, whose total length is at least 50 μm , in the visual field, 50 x 50 μm , observed under a scanning electron microscope with a magnification of x1000. The term "total length" means a value of the sum of the lengths of elongated tiny depression (0.5-5 μm wide) present in the visual field. Specification at page 7, line 24 to page 8, line 8.

Claims 1, 4 and 15-18 are rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 6,383,333 ("Haino") in view of U.S. Patent No. 5,993,596 ("Uwai") and U.S. Patent No.

5,833,754 ("Ito"). In addition, Claims 2 and 3 are rejected under 35 U.S.C. § 103(a) over Haino, Uwai and Ito, and further in view of U.S. Patent No. 5,324,411 ("Ichishima").

Haino discloses a hollow, protection member 2 arranged along the inner wall of a plasma processing apparatus. The hollow, inner wall protection member 2 is formed of a glass-like carbon material and has an average surface roughness on its *inner surface* of 2.0 μm or less. Haino discloses that the inner surface of the protection member is gradually worn out by reaction with corrosive gas during plasma processing and that if the average surface roughness exceeds 2.0 μm , then the inner surface of the protection member 2 may fall off as particles depending on wear conditions. Haino at Abstract; Fig. 1; column 2, lines 42-44; 53-55; column 3, lines 17-18; 47-54; column 4, lines 35-36; 62; column 6, lines 53-56.

Ito discloses a shield (i.e., sleeve 9) "disposed closely adjacent to but spaced from the inner surface of the generally cylindrical sidewall portion" of a reaction chamber 1 of a deposition apparatus. Ito at title; abstract; column 2, lines 35-64; column 3, lines 26-40.

Uwai is cited for disclosing a component for plasma processing having a reduced metal impurity content. Final Rejection at page 2, section 5. Ichishima is cited for disclosing a glass-carbon component having porosity. Final Rejection at page 4, section 17.

However, the cited prior art fails to suggest the independent Claim 1 limitations of a component of glass-like carbon "having a surface finished such that there exist in the visual field, $50 \times 50 \mu\text{m}$, observed under a scanning electron microscope with a magnification of $\times 1000$, at least five pits, 1-10 μm in diameter, and elongated tiny depressions, 0.5-5 μm wide, whose total length is at least 50 μm ".

Furthermore, the cited prior art fail to suggest the technical idea of surface design of glass-like carbon for the purpose of increasing the adhesion strength between components of glass-like carbon and films deposited by CVD. Because the purpose and effect of the present invention is so different than that of the cited prior art, there is no reasonable expectation that

the cited prior art would have led the skilled artisan to the independent Claim 1 limitations of a component of glass-like carbon "having a surface finished such that there exist in the visual field, $50 \times 50 \mu\text{m}$, observed under a scanning electron microscope with a magnification of $\times 1000$, at least five pits, 1-10 μm in diameter, and elongated tiny depressions, 0.5-5 μm wide, whose total length is at least 50 μm ".

Because the cited prior art fails to suggest all of the limitations of independent Claim 1 and there is no reasonable expectation of success, independent Claim 1 is patentable over the cited prior art.

Independent Claim 16 is also patentable over the cited prior art.

The Final Rejection asserts:

10. Examiner notes that one of ordinary skill in the art would have recognized that providing any surface that **might be exposed to the processing conditions**, whether purposefully or inadvertently, with the same surface roughness characteristics and composition properties as taught for the inner surface directly adjacent the processing area would have been advantageous in order to prevent the detrimental results associated with deposition processing as taught in Haino et al. and Uwai et al.

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12. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made that when using an inner tube set at a distance from an inner wall of a processing chamber as taught by Ito et al. to have provided any and all surfaces of the inner tube that **might come in contact with the processing environment** with the same surface roughness characteristics and composition properties as provided on the inner surface of the inner tube in order to achieve a reduction of impurities introduced into the processing environment as disclosed by Haino et al., Uwai et al. and Ito et al. (Bold emphasis added.)

However, Ito discloses that the outer wall of Ito's shield (i.e., sleeve 9) does **not** come in contact with a processing environment. In particular, Ito discloses:

In the apparatus of FIG. 2, it will be seen that a sleeve 9 of quartz glass is provided along the inner wall of the chamber 1 with a thickness of about 2 mm to surround the susceptor 2 including the wafer 10 held thereon as well as a major portion of the support rod 3. The **sleeve 9** may be provided **in contact with the inner wall of the reaction chamber 1**, particularly when a heat insulating material is used for the sleeve 9 or when a quartz glass is used for

the chamber 1 in combination with the cooling system 8. However, it is **more preferable** to space the sleeve 9 from the inner wall by a **minute distance** that is **set to prohibit the reactant gases from entering into the space between the sleeve 9 and the inner wall**. Typically the sleeve 9 is separated from the inner wall of the reaction chamber 1 by a distance of 1-2 mm. Ito at column 3, lines 27-41 (emphasis added).

Thus, although Ito discloses that the shield (i.e., sleeve 9) is separated from the inner wall of the reaction chamber 1, Ito discloses that the separation is so small that reaction gases cannot enter the space between the outer wall of the shield and the inner wall of the chamber and expose the outer wall of the shield to processing conditions. Absent impermissible hindsight reasoning (M.P.E.P. § 2145.X.A), Ito does not suggest that the entire outer wall of Ito's sleeve 9 "might" come in contact with the processing environment.

Because the outer wall of Ito's shield (i.e., sleeve 9) is close enough to the inner wall of the chamber so as not to be exposed to processing conditions, and the outer wall of Haino's protection member 2 is adjacent to the inner wall of the plasma processing apparatus and not exposed to plasma, neither Ito nor Haino is concerned with controlling the roughness of the outer wall of their respective shield or protection member to limit reaction chamber contamination. Thus, there is no reasonable expectation that the skilled artisan would have been led by Itô or Haino to successfully reach the feature of independent Claim 16 of a component having a value of surface roughness (Ra), *over the entire surface of the component*, ranging from 0.1 to 10 μm (measured according to JIS B0601).

Uwai and Ichishima fail to remedy the deficiencies of Haino and Ito.

Thus, the prior art rejection of independent Claim 16 should be withdrawn.

Pursuant to M.P.E.P. § 821.04, after independent product Claim 1 is allowed, Applicants respectfully request rejoinder, examination and allowance of withdrawn process Claims 5-14, which include all of the limitations of product Claim 1.

Application No. 10/631,790
Reply to Advisory Action of May 10, 2006 and
Reply to Office Action of January 25, 2006

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

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